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PEAT EXTRACTION:
EXISTING AND PROPOSED OPERATIONS
IN MINNESOTA

BY

MARY KING HOFF

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INTRODUCTION

During the last decade Minnesota's six million acres of peatlands have come under increasing scrutiny as a potential source of jobs and energy for a state in need of both. The flurry of interest began in 1974 with a bid by Minnegasco to construct a large-scale peat gasification facility on some 200,000 acres of state-owned peatlands; however, bureacratic response to the proposal soon went beyond evaluation of the isolated case to include establishment of a long-range state peatland management policy. Thus, much of the early activity was expressed in the form of basic research and discussions involving policymakers, analysts and scientists, rather than in attempts to directly engage in or encourage peat development.

But in addition to--and largely because of--this preliminary activity, there has been a general refocusing of public attention on peatlands as a resource rather than a wasteland, and a number of proposals to develop Minnesota's peatlands subsequently have been made, and in some cases, implemented.

Although a few longstanding commercial peat operations in the state have been described in earlier reports, no effort yet has been made to compile a comprehensive listing of peat development projects that have sprung up in the wake of this increased attention. This paper represents an attempt to fill that gap by identifying and characterizing existing and proposed extractive peat operations in Minnesota.*

The Minnesota Department of Natural Resources Peat Program cooperated fully in the production of this report.

*Due to time constraints, this report does not include any information on non-extractive peatland development, e.g., timber and agricultural crop production. These activities, though scattered, comprise a significant fraction of total peat utilization in Minnesota, and should not be disregarded. Previous studies (Farnham, 1978, Kurmis et al., 1978) provide valuable though dated surveys of non-extractive peatland uses in the state.

OVERVIEW

Prior to 1980, there were remarkably few active commercial peat operations in the state. Reports by Farnham (1978) and the Minnesota Department of Natural Resources (DNR) (1981) list the number as three and four, respectively.

This study, conducted in November and December of 1982, has identified a total of eight existing and eight proposed extractive peat operations in the state.* (See map, page 6.) Current interest in peat extraction is limited to the marketing of peat as either a horticultural product or a fuel; within these categories, there have been a number of different approaches taken to development--ranging from a small-scale fuel peat producer who began two years ago to run his own furnace (but not much else) on peat, to a 200,000 bales-per-year horticultural operation which has been mining peat in Minnesota for 35 years.

Despite this diversity, a few general statements can be made about the status and characteristics of extractive peat use in Minnesota:

1. Peat mining and processing is occuring on--and being proposed for--a broad range of scales using a wide variety of technologies. Acres in actual production range from 2 to 950 for existing peat mining operations; although most of the proposed projects are for development of relatively small peatlands, one firm specified that a minimum of 6,000 acres of peat would be required. Extraction technologies include milling (by far the most common), sod production, and hydraulic mining. Air-drying is the most common dewatering technique, but use of thermal dryers and wet carbonization is being proposed as well. End products include bagged, baled and bulk horticultural peat, and fuel pellets and briquettes.
2. Horticultural peat production is by far the predominant use of peat in Minnesota. There are six commercial horticultural peat producers in operation in the state with a total of some 7,200 acres in peat holdings, about one-fourth of which is under actual production (Table 1, page 17). In addition to these currently-producing operations, there are proposals for the development of five additional horticultural peat operations, three of which would include fuel peat production as well.

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*In addition to the eight readily identifiable peat mining operations, there are many small "black dirt" producers--persons whose primary source of income is not derived from peat production, but who supply minor quantities of peat to area developers, landscapers, and building contractors. Although the contribution from these sources is not readily quantifiable, it is said to be substantial (R. Farnham, personal communication).

3. Fuel peat is increasingly being viewed as a viable commercial product, rather than a novel but impractical end use. There are currently two active fuel peat producers in the state. Although both are small, pilot-type projects, the additional five fuel peat projects now at the proposal stage suggest that this peat use will receive increasing attention in the future. Generally, the consensus is that available technology is adequate for fuel peat mining and processing, although there undoubtedly will be some modifications in specific processes as they are implemented. The main obstacles to peat fuel production at this time appear to be initial financing of new operations, the element of risk involved in producing an innovative product without a guaranteed market, and uncertainty as to whether fuel peat can be produced at a per-Btu cost competitive with that of conventional fuels.

4. A substantial amount of development has occurred on private rather than state-owned peatlands. Although some 60 percent of Minnesota's peatlands are publicly-owned, more than half of those held by horticultural or fuel peat producers are on private land. This bias has implications for peatland regulation strategies, since peat management policies adopted by the state Department of Natural Resources generally apply only to publicly-held peatlands.

5. The future of the horticultural peat market is not clear. Although several operators hoping to break into the horticultural peat market seem optimistic about the demand for horticultural products (one company, for example, estimated annual growth rates in U.S. demand for bagged peat and sphagnum bales at 10-15 percent and 20 percent, respectively), a number of current producers are less enthusiastic, noting that the currently depressed housing and construction market is dampening demand for peat. At least one producer has plans to expand his operation, but is waiting for more favorable economic conditions. Ironically, most of the horticultural peat produced in Minnesota is marketed elsewhere, leaving the state a net importer of peat.

6. Future development seems largely contingent on some sort of public financing. Several persons interviewed who have proposed peatland development noted that realization of their proposed development scheme is dependent on financial support of some type, presumably in the form of public loans or market guarantees. It is possible that some of the more ambitious projects could operate independently on a smaller scale; the stated need for assistance should be considered in the context of current state government interest in providing economic incentives for peat development.

Descriptions of the individual operations and proposals follow.

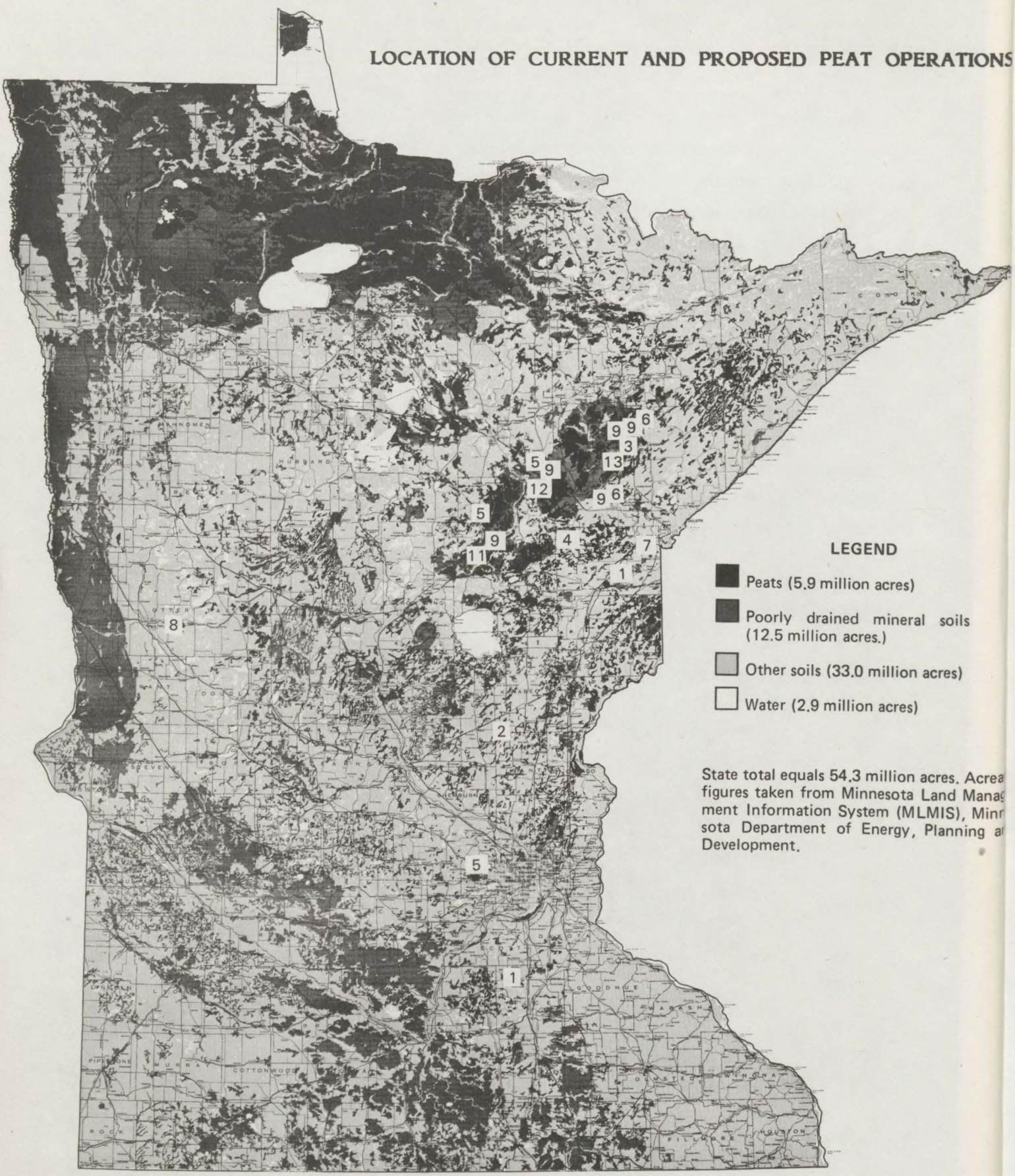
NOTE:

Production estimates are given in the units--tons, "yards" (cubic yards) or bales--reported by the individual operators. Sphagnum and hypnum (fibric peat) production is conventionally measured in six-cubic-foot bales, and reed-sedge peat in tons or yards. The Minnesota Department of Natural Resources, which measures all peat production in tons for royalty purposes, uses the following conversion factors:

109 T dry hypnum/sphagnum = 1 acre-foot = 4,840 yd^3
163 T dry reed-sedge = 1 acre-foot = 4,840 yd^3
1 T sphagnum = 20 bales

Descriptions of production methods and products also are given as reported by the operator rather than described categorically in order to preserve detail and minimize potential misinterpretation.

LOCATION OF CURRENT AND PROPOSED PEAT OPERATIONS



State total equals 54.3 million acres. Acrea figures taken from Minnesota Land Manag ment Information System (MLMIS), Minn sota Department of Energy, Planning a Development.

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EXISTING OPERATIONS

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1.	ELI COLBY, P.O. Box 248, Lake Mills, IA 50450 (515) 592-4121 (John Colby, Sr.)
TYPE:	Horticulture
ESTABLISHED:	1939; began operations in Minnesota in 1980.
TYPE OF PEAT:	Hypnum
DESCRIPTION OF SITE:	Two privately-owned plots: a 160-acre bog in northeastern Rice County, all under production; and a 280-acre inactive tract in Carlton County.
PRODUCTION METHODS:	The peat is cut with drag lines, field dried, and loaded by conveyor belt onto wagons.
PRODUCT:	Baled peat moss; packaged potting soil.
TRANSPORTATION:	Truck
MARKET:	Nurseries and greenhouses. Less than 5 percent of the market is in Minnesota.
PRODUCTION ESTIMATES:	"Hundreds of truckloads"
NUMBER OF EMPLOYEES:	No Minnesota employees (labor requirements for Minnesota operations are filled by Iowans brought into the state).
ADDITIONAL INFORMATION:	The company has unspecified plans to develop its Carlton County land, and is currently discussing lease of state peatland with the MN Department of Natural Resources.

2.	LIFETIME NURSERY PRODUCTS, Route 1, Ogilvie, MN 56358 (612) 983-6853 (Pierre Santele)
TYPE:	Horticulture
ESTABLISHED:	Summer, 1981
TYPE OF PEAT:	Hypnum
DESCRIPTION OF SITE:	700-acre privately-owned deposit located 8 miles southwest of Ogilvie in Isanti County; about 1/3 is in actual production.
PRODUCTION METHODS:	Vacuum harvestor
PRODUCT:	Baled and bagged peat
TRANSPORTATION:	Truck
MARKET:	Nurseries and mushroom growers. About 5 percent of the product remains in Minnesota.
PRODUCTION ESTIMATES:	100,000 bales (6 ft^3 and 4 ft^3) so far (two seasons)
NUMBER OF EMPLOYEES:	18 summer; 5-6 winter
ADDITIONAL INFORMATION:	The company hopes to expand its Minnesota market, and is looking at producing pelletized peat as a lawn-care product. Since hypnum is a valuable horticultural peat and has a relatively high pH, it is not being considered for fuel use.

3.	MESABI PEAT, Route 1, Box 99, #38, Iron, MN 55751 (218) 744-3976 (Roger Arne)
TYPE:	Energy
ESTABLISHED:	1980 (started harvesting in July, 1982)
TYPE OF PEAT:	Reed-sedge
DESCRIPTION OF SITE:	600 acres of private land, located about 5 miles south of Zim in St. Louis County. About 30 acres are under production.
PRODUCTION METHODS:	Modified Irish peat extruder produces sods which are then windrowed and air-dried; modified potato digger used to collect sods.
PRODUCT:	Peat sods for pelletization
TRANSPORTATION:	Truck
MARKET:	Sods are converted into fuel pellets at Aspenal, Inc. for use in test burns at the Virginia, Minnesota municipal power plant.
PRODUCTION ESTIMATES:	400 T so far
NUMBER OF EMPLOYEES:	5-6
ADDITIONAL INFORMATION:	Would like to stay in energy market, expand production.

4.	MICHIGAN PEAT COMPANY, Cromwell, MN 55726 (218) 644-3993 (Allen Houck, plant manager)
TYPE:	Horticulture
ESTABLISHED:	1958 in Minnesota
TYPE OF PEAT:	Sphagnum
DESCRIPTION OF SITE:	3,000 acres in two bogs about 35 miles west of Duluth, under lease from the state; 800 acres currently under production.
PRODUCTION METHODS:	Vacuum-harvested, air-dried. Peat is mined to a depth of about 4 feet; total removal is expected to be 8 feet.
PRODUCT:	Baled peat
TRANSPORTATION:	Truck and rail (Burlington Northern)
MARKET:	Nationwide; Minnesota comprises about 5 percent of the total market.
PRODUCTION ESTIMATES:	200,000 - $6ft^3$ bales/year equivalent
NUMBER OF EMPLOYEES:	60 summer; 20 winter
ADDITIONAL INFORMATION:	Market slow now.

5.	PEAT RESOURCES, INC., 1695 N. County Rd. 18, Minneapolis, MN 55441, (612) 546-0243 (Mike Marcy, president)
TYPE:	Horticulture
ESTABLISHED:	October 1982 (took over operations that had been in business 11-14 years).
TYPE OF PEAT:	Reed-sedge
DESCRIPTION OF SITE:	Has rights to two privately-owned tracts: 60 acres in western Hennepin County, and 640 acres in northeastern Aitkin County. The company will be acquiring rights to a 520-acre peatland, also in Aitkin County, in January 1983.
PRODUCTION METHODS:	Scraped, air-dried on site.
PRODUCT:	Bulk peat only (but does produce some bagged peat through Northern Peat Management Company - see below).
TRANSPORTATION:	-
MARKET:	Mainly nurseries and landscapers in Minnesota.
PRODUCTION ESTIMATES:	2500 yd^3 so far (October-November)
NUMBER OF EMPLOYEES:	2 regular; 1 contracted
ADDITIONAL INFORMATION:	PRI is exclusively a raw peat producer; one of its shareholders, Northern Peat Management Company (operated by Merlyn Peltier) handles processing and marketing for the company. According to Marcy, PRI anticipates expanding its horticultural market by manufacturing baled peat for southwestern U.S. markets, but will avoid the energy market unless prices become more favorable.

6.	POWER-O-PEAT, INC., P.O. Box 956, Gilbert, MN 55741 (218) 744-4397, (J. Leoni, president)
TYPE:	Horticulture
ESTABLISHED:	1957
TYPE OF PEAT:	Reed-sedge/sphagnum
DESCRIPTION OF SITE:	950 acres privately-owned land in the Central Lakes bog under active production and 836 acres inactive state-owned land in the Arlberg bog (both in St. Louis County).
PRODUCTION METHODS:	Milling
PRODUCT:	Bagged peat moss, potting soils
TRANSPORTATION:	Truck and rail (Duluth, Winnipeg, Pacific)
MARKET:	Nationwide; less than 50 percent is marketed in Minnesota.
PRODUCTION ESTIMATES:	Roughly 20,000 T in 1982 season.
NUMBER OF EMPLOYEES:	100 winter; 40 summer
ADDITIONAL INFORMATION:	No plans to bid on state peat leases in the future.

7.	DON SOLVALD, 53 Church Road, Esko, MN 55733 (218) 723-7271
TYPE:	Energy
ESTABLISHED:	1980
TYPE OF PEAT:	Reed-sedge (some sphagnum)
DESCRIPTION OF SITE:	20 acres of private land near Esko (Carlton County); all drained, partly cleared.
PRODUCTION METHODS:	"Conventional" - draglines, air dried, then thermal dryer.
PRODUCT:	Peat cubes
TRANSPORTATION:	-
MARKET:	Produces for own use only, but plans to market peat fuel next year.
PRODUCTION ESTIMATES:	Plans to produce 2,500 T (10,000 yd^3) next year.
NUMBER OF EMPLOYEES:	1
ADDITIONAL INFORMATION:	Solvald originally mined and cubed peat on his own property, but found he could buy peat from Power-O-Peat at a lower cost, so moved his operation there last year. However, he discovered that the mineral content of the horticultural peat was too high for fuel use, so he's planning to move back to his own bog next season. Although he only produced for himself this year, he plans to expand next year. He apparently has markets identified, but wouldn't identify them. He said he is using a cuber instead of a pelletizer because the energy requirement is lower.

8.	TAMARACK PEAT MOSS COMPANY, Route 1, Underwood, MN 56586 (218) 826-6620 (Jerry Ewert)
TYPE:	Horticulture
ESTABLISHED:	1979
TYPE OF PEAT:	Hypnum
DESCRIPTION OF SITE:	100-acre, privately owned deposit; peat has been removed to mineral soil depth (9 ft.) on about 2 acres so far.
PRODUCTION METHODS:	Peat is removed with "hydraulic excavator" (backhoe on tracks), loaded wet, and air-dried in windrows on dry land.
PRODUCT:	Bulk peat and peat-sand mixture
TRANSPORTATION:	-
MARKET:	Nurseries, landscapers, and golf courses; about 75 percent of the peat produced is sold for use in Minnesota.
PRODUCTION ESTIMATES:	20,000 yd^3 so far (4 seasons)
NUMBER OF EMPLOYEES:	0
ADDITIONAL INFORMATION:	Ewert wants to hire help and expand into packaged peat eventually, but is waiting until the market is more encouraging.

TABLE 1

SUMMARY OF EXISTING EXTRACTIVE PEAT OPERATIONS IN MINNESOTA

Map No.	Product	Operator	Total Acres	Acres State/ Private	Acres in Production	Peat Type
1	Hort. peat	Eli Colby	440	0/440	160	hypnum
2	Hort. peat	Lifetime Nursery Products	700	0/700	230	hypnum
3	Fuel peat	Mesabi Peat	600	0/600	30	reed-sedge
4	Hort. peat	Michigan Peat Company	3,000	3000/0	800	sphagnum
5	Hort. peat	Peat Resources, Inc.	1,220	0/1220	-	reed-sedge
6	Hort. peat	Power-O-Peat, Inc.	1,786	836/950	950	reed-sedge/ sphagnum
7	Fuel peat	Don Solvald	20	0/20	-	reed-sedge/ sphagnum
8	Hort. peat	Tamarack Peat Moss Co.	100	0/100	2	hypnum
		TOTALS	7,866	3,836/4,030	2,172	

PROPOSED OPERATIONS

9. AMERICAN PEAT COMPANY, 6940 Hickory Dr. N.E., Minneapolis, MN 55432
(612) 571-9172 (Don Mittelstadt, president)

TYPE:	Horticulture/energy
ESTABLISHED:	Incorporated September 1982 (had operated previously as a marketing firm).
TYPE OF PEAT:	None now; plan to extract sphagnum and reed-sedge.
DESCRIPTION OF SITE:	No current holdings; however, APC is in the process of acquiring leases, titles, or other rights to five tracts of land: - 630 acres state land in St. Louis County (West Central Lakes) - 3,500 acres private land near Zim - 500 acres private land near Wawina - 600 acres private land near Palisade - 2,872 acres state land in St. Louis County (Arlberg bog)
PRODUCTION METHODS:	Disc, harrow, windrow, air-dry. Fuel peat would be converted to cubes or pellets.
PRODUCT:	Potting soil bags, sphagnum bales, bulk peat, solid fuel.
TRANSPORTATION:	Truck in-state, rail out-of-state
MARKET:	Anticipate marketing about 80 percent of the horticultural products and 100 percent of the fuel peat in Minnesota.
PRODUCTION ESTIMATES:	1983 season: 500,000 bags potting soil, 42,000 yd^3 bulk peat, 57,000 T. sphagnum bales, 30,000 T solid fuel.
NUMBER OF EMPLOYEES:	First six months - 72 employees (29 permanent); anticipate 479 jobs by 1986.
ADDITIONAL INFORMATION:	APC plans to start producing sphagnum bales from its Wawina bog in spring, 1983 and from its Central Lakes bog later in the year. Fuel production also will begin in 1983 at a pilot cubing plant at the Palisade bog. The company's fuel marketing strategy is to sell first to industrial users, then expand to commercial and residential markets. It is planning to supply 7,000 to 10,000 T of milled peat from the Zim bog to NSP for burning in the utility's LaCrosse, Wisconsin power plant in May or June of 1983. Development on the scale described above is contingent on some type of public financing, although the company would proceed on a smaller scale if this proposal proves unfeasible.

10.	CONSTRUCTION INDUSTRIES ASSOCIATES, INC., 14525 Hwy. 7, Woodhill Plaza, Minnetonka, MN 55343 (612) 933-3831 (Bruce Schmidt)
TYPE:	Energy
ESTABLISHED:	1982
TYPE OF PEAT:	-
DESCRIPTION OF SITE:	-
PRODUCTION METHODS:	Roscoe Brown Bear I harvestor; windrowed and field-dried; Harris dryer-pulverizer; California Pellet Mill pelletizer.
PRODUCT:	Fuel pellets
TRANSPORTATION:	-
MARKET:	-
PRODUCTION ESTIMATES:	34,000-52,000 T/yr (30-40 acres, 4 feet deep)
NUMBER OF EMPLOYEES:	Approx. 9
ADDITIONAL INFORMATION:	Schmidt is primarily interested in providing a harvesting/drying/pelletizing system he has developed to interested producers. According to his proposal, the system would provide peat pellets at $1.54-$1.77/mBtu, with an initial investment of $1 million and 150-180 days lead time; environmental impacts of the relatively small-scale operation would be minimal, and approximately 60 percent of the materials used would be purchased in Minnesota.

11.	CUSTOM DRYING, INC. P.O. Box 308, Emily, MN 56447 (218) 792-5122 (Chuck Srock)
TYPE:	Horticulture/energy
ESTABLISHED:	-
TYPE OF PEAT:	Sphagnum/reed-sedge
DESCRIPTION OF SITE:	160-acre state lease pending on a raised bog in Aitkin County.
PRODUCTION METHODS:	Roto-till and windrow.
PRODUCT:	Horticultural peat and fuel pellets.
TRANSPORTATION:	-
MARKET:	Horticultural peat primarily out-of-state (some overseas); fuel pellets would be used locally in schools now burning wood pellets.
PRODUCTION ESTIMATES:	45,000 T horticultural peat the first year in operation; fuel pellet production would not begin until the second season.
NUMBER OF EMPLOYEES:	20 the first year; 40 the second year.
ADDITIONAL INFORMATION:	Also looking at a plan to fuel small-scale gasifier with bulk peat.

12.	JOSEPH GIBBS, 914 Wood Land Ave., Duluth, MN 55812 (218) 728-6358
TYPE:	Horticulture
ESTABLISHED:	-
TYPE OF PEAT:	Sphagnum
DESCRIPTION OF SITE:	72-acre privately owned bog near Floodwood, on the Itasca-Aitkin County line.
PRODUCTION METHODS:	-
PRODUCT:	Bagged peat only
TRANSPORTATION:	Truck
MARKET:	Greenhouses
PRODUCTION ESTIMATES:	-
NUMBER OF EMPLOYEES:	Less than 10
ADDITIONAL INFORMATION:	Gibbs bought the land from a peat producer six years ago, but has not yet begun production.

13.	E.C. (GENE) HARTER, P.O. Box 1059, Layfayette, CA 94549 (415) 284-4728
TYPE:	Horticulture/energy
ESTABLISHED:	-
TYPE OF PEAT:	-
DESCRIPTION OF SITE:	2,000-plus acres (privately owned) adjacent to the IRRRB Wilderness Valley experimental farms at Zim.
PRODUCTION METHODS:	-
PRODUCT:	Horticulture peat and fuel.
TRANSPORTATION:	-
MARKET:	-
PRODUCTION ESTIMATES:	-
NUMBER OF EMPLOYEES:	-
ADDITIONAL INFORMATION:	Harter is currently a partner in Mesabi Peat Company, which operates on land formerly a part of this tract. He is now looking for financial backing to begin horticultural and fuel peat production on a larger scale.

14.	NORTHERN BIOFUELS, INC., 33 First St. N.E. Crosby, MN 56441 (218) 546-8318 (Cliff Mikkola, executive director)
TYPE:	Energy
ESTABLISHED:	(plan to start production in spring of 1983)
TYPE OF PEAT:	Reed-sedge
DESCRIPTION OF SITE:	Now looking for a small (300 acres or less) state-owned tract near Crosby to lease from the MN Department of Natural Resources.
PRODUCTION METHODS:	Augers, windrowed, field-dried, thermal dryer and California Pellet Mill pelletizer.
PRODUCT:	Peat/sawdust fuel pellets (approx. 30 percent peat).
TRANSPORTATION:	-
MARKET:	Schools, small industries, hospitals, private homes, etc. in 50-mile radius of Crosby (have identified a year-round market).
PRODUCTION ESTIMATES:	15-20,000 T pellets/yr.
NUMBER OF EMPLOYEES:	About 6 initially
ADDITIONAL INFORMATION:	The company plans to use peat from existing producers in Aitkin County until it is able to acquire land and begin production on its own.

15.	PEAT SYSTEMS INTERNATIONAL CORP., 12007 Hitching Post Lane, Rockville, MD 20852 (301) 468-1521 (Melvyn Kopstein)
TYPE:	Horticulture
ESTABLISHED:	(Could begin production as early as mid-1985)
TYPE OF PEAT:	Sphagnum
DESCRIPTION OF SITE:	Now negotiating lease with the MN Department of Natural Resources on a 160-acre sphagnum tract southwest of Duluth.
PRODUCTION METHODS:	"State of the art" - will use technologies that have been developed already in Europe and elsewhere, but will emphasize use of Minnesota-made equipment.
PRODUCT:	Bagged peat and a new horticultural product (wouldn't specify).
TRANSPORTATION:	-
MARKET:	General horticultural markets; will emphasize Minnesota markets but take advantage of others as well.
PRODUCTION ESTIMATES:	12,000-15,000 T/yr.
NUMBER OF EMPLOYEES:	Approx. 20
ADDITIONAL INFORMATION:	Development is contingent on public financing--industrial bond/loan guarantees.

16. WHEELABRATOR-FRYE, INC., Liberty Lane, Hampton, NH 03842 (603) 926-5911 (John Rohrer, engineering vice-president of energy division)

TYPE: Energy

ESTABLISHED: -

TYPE OF PEAT: -

DESCRIPTION OF SITE: No site yet identified; minimum requirement would be 6,000 acres to be mined over a 20-year facility life.

PRODUCTION METHODS: Wet extraction, wet carbonization.

PRODUCT: Fuel pellets or briquettes.

TRANSPORTATION: -

MARKET: Initially, large utilities or industries with coal-burning capabilities; later, residential, commercial and small industrial uses.

PRODUCTION ESTIMATES: Minimum 250,000 T/yr fuel output.

NUMBER OF EMPLOYEES: 150 minimum, including fuel production and transportation.

ADDITIONAL INFORMATION: Wheelabrator-Frye, as the North American representative of a Finnish fuel-peat producer, is currently evaluating the commercial prospects for peat fuel production in Minnesota and in several other locations in the U.S. and Canada. According to Rohrer, the company's involvement in Minnesota at this time is strictly exploratory; eventual development depends largely on state policy in the areas of financial incentives and environmental restrictions.

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Fuchsman, Charles H. 1981. Potential industrial chemical utilization of Minnesota peat. Minnesota Department of Natural Resources Peat Program Report.

PROJECT PROPOSALS

Wheelabrator-Frye, Inc. (John Rohrer)
American Peat Company (Control Data Business Advisors, Inc.)
Construction Industries Associates, Inc. (Bruce Schmidt)

OTHER

Miscellaneous information on wetland biomass fuels production:

- Energy Farming on Minnesota's Wetlands (University of Minnesota publication)
- Description of field trial experimental design.
- Paper given by Dean Dubbe at the International Peat Symposium in Duluth, October 1981.
- Bibliography, Bio-Energy Coordinating Office publications.

List of state regional development commission chairmen and staff directors.

Bid application packet for Arlberg bog.

Newspaper clip: "Sweden's Experiment: Peat Program May Hold Lessons for Minnesota." Duluth News-Tribune, 11/28/82.

Environmental Assessment Worksheet (EAW) for Fleet Development and Management Corp. (now American Peat) West Central Lakes peatland (Oglebay-Norton tailings basin).

SOURCES FOR UPDATES

Rouse Farnham, University of Minnesota Soils Science Department, 373-1447.

Don Grubich, IRRRB Research Director, (218) 749-8260.

Randy Lasky, ARDC Physical Resource Planning Director, (218) 722-5545.

Norm Paurus, Control Data Business Advisors, Inc., 853-4519.

Steve Holmstock, Minnegasco, 372-4757.

Terry Greenside, Itasca County Planner, (218) 326-9288.

Bob Kramer, Bachman's, 861-7612.

Einar Johnson, Rosjo Torv, 545-9294.*

Tony Pascal, Minnesota Department of Natural Resources, 296-4807.

Jim Idzorek, Minnesota Department of Energy, Planning and Development, 296-3741.

Ted Barker, 2002 Trust Board Administrator, (218) 744-4638.

Cliff Mikkola, Cayuna Range Development Corp., (218) 546-8318.

Minnesota Industrial Minerals Directory (annual--available from the University of Minnesota Mineral Resources Research Center, 373-3341).

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*Representative of Swedish firm that is looking at Minnesota peat but has no definite plans right now.

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